



TRENTON

SEWAGE TREATMENT PLANT

ANNUAL REPORT

1960

PREPARED BY

THE DIVISION OF PLANT OPERATIONS

ONTARIO WATER RESOURCES COMMISSION

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ANNUAL REPORT

The Town of Trenton approached the OWRC in 1956 and requested aid in the finance, design and construction of certain sewage works. Gore and Storrie Limited who prepared the original report in 1950 were asked to prepare the necessary plans and specifications.

In 1957, the Town of Trenton entered into an agreement with the OWRC for the construction and operation of sewage treatment facilities, the cost of which was to be repaid by the Town over a thirty year period.

Subsequent to the Ontario Municipal Board's approval, work was initiated on Stage I of the project.

Stage I was resolved to include:

1. 24" sewer on the west side of the trent River and across to the Dundas Street pumping station.
2. Pumping Station at Dundas Street on the East side of the river.
3. 16" dia. force main from pumping station to sewage treatment plant.
4. Primary sewage treatment plant at Herman Street. Capacity - 1.0 MGD
5. 30" dia. outlet pipe from plant to 500 ft. offshore.
6. Interceptor and connecting sewers.

Total cost approximately - \$495,000.

Tenders were called for November, 1958 and work was begun in the spring of 1959.

The contracts for the various portions of the system were largely completed by December, 1959.

Plant Operations Division of the OWRC took over the operation of the sewerage system in January 1960, with Mr. A. Hockaday as operator.

Capital Costs of the Project:

27,260.00	- Connecting Sewers
32,650.00	- Force Main
57,700.00	- River Crossing
17,225.00	- Fairbanks-Morse
94,567.00	- Sewage Pumping Station
187,204.00	- Sewage Treatment Plant
43,413.00	- Interceptor Sewer on Ontario St.
<u>33,000.00</u>	- Engineering
493,000.00	approx.

<u>or</u>	<u>Sewers</u>	<u>Plant</u>
	27,260.00	17,225.00
	32,650.00	94,567.00
	57,700.00	<u>187,204.00</u>
	<u>43,413.00</u>	
	161,053.00	298,946.00
	<u>15,000.00</u> Engineering	<u>18,000.00</u> Engineering
	176,053.00	317,000.00

In the calendar year 1960 the sewage treatment plant treated approximately 300 million gallons of sewage for an operating cost of approximately \$8,000.00.

This would be an average operating cost of \$0.027 per thousand gallons treated or less than $\frac{1}{2}$ ¢ per person per day.

Assuming a life of 30 years for the plant and 50 years for the sewers and the value of money at 5%, the average annual capital cost is \$33,300.00.

Therefore, the total operating and capital cost of treatment is \$0.154 per thousand gallons.

or $1\frac{1}{2}$ ¢ per person per/day.

TYPE OF PLANT

Primary Treatment with provision for extension to complete treatment.

DESIGN POPULATION

12,000 persons initially; 15,000 persons when extended to complete treatment and with provision for doubling to 30,000 persons. Initial grit removal, screening and outlet sewer facilities sized for 30,000 population.

PER CAPITA FLOW

83.3 Gallons per day.

DESIGN PLANT FLOW

1.0 MGD = 111.0 cu. ft./min = 6,670 cu. ft./hr.

5 day BOD of raw sewage:

250 ppm

Removal 35%

Suspended solids of raw sewage:

200 ppm

Removal 55%

DIAMETER OF INLET SEWER:

24"

DIMENSION OF INLET CHAMBER: 4' -3" x 3' -9" x 11' -3"

The raw sewage flows through a 24" x 24" sluice gate into the aerated grit chamber from an inlet chamber.

DIMENSION OF GRIT CHAMBER:

10' -0" x 8' -6" x 9' -0"

VOLUME OF AERATED GRIT CHAMBER:

765 cu. ft. (not including the hopper)

DETENTION PERIOD:

$\phi \text{ 1. MGD} = \frac{765}{110.0} = 6.95 \text{ minutes}$

Grit removal by air lift to decanting trough and wheel barrow.

The sewage flows to the screen chamber and thereafter to the distri-

tribution channel of the settling tanks.

SCREENING:

1 hand cleaned bar screen, with provision for installation of mechanically cleaned bar screen for ultimate plant capacity.

AVAILABLE AREA:

5.29 sq. ft.

PRIMARY SETTLING TANK:

2 units

DIMENSION OF TANKS:

2 (52' x 16' x 12')

VOLUME OF TANKS:

20,000 cu. ft. (not including the sludge hopper)

DETENTION PERIOD @ 1 MGD

$$\frac{20,000}{8350} = 2.4 \text{ hours}$$

SURFACE SETTLING RATE: @ 1 MGD

$$\frac{1,000,000}{2(52' \times 16')} = 600 \text{ gal/feet}^2 \text{ of tanks/day}$$

$$\text{@ 1.25 MGD} \quad \frac{1,250,000}{2(52' \times 16')} = 755 \text{ gals/feet}^2 \text{ of tanks/day}$$

WEIR OVERFLOW RATE:

$$\frac{1,000,000}{120} = 8300 \text{ Gals/lin. ft. of weir/day}$$

$$\text{@ 1.25 MGD} \quad \frac{1,250,000}{120} = 10,400 \text{ Gals/lin. ft. of weir/day}$$

RAW SLUDGE REMOVAL:

Longitudinal sludge collector to single sludge hopper each pass of settling tank.

TWO DIGESTION TANKS, TWO STAGE OPERATION

DIMENSION OF TANKS:

Diameter 28')
Depth 23') No. 1.

Diameter 28')
Depth 22') No. 2

TOTAL VOLUME OF TANKS: 12,717 + 12,117

HEATED DIGESTERS CAPACITY

$$\frac{24,834}{12,000} = 2.08 \text{ cu. ft./capita}$$

First stage tank is heated by a sludge heater of capacity, 170,000 BTU per hour.

Recirculation of gas in the first stage tank is by gas pump with a capacity of 150 cfm. Gas withdrawn is used for plant heating as available. Provision has been made for both digestion tanks to be used as first stage tanks when the plant is extended for 15,000 persons, and a third digestion tank will be constructed as a second stage tank.

DIGESTED SLUDGE DISPOSAL:

Digested sludge is disposed of by tank truck haulage.

VALVE HOUSE BETWEEN TWO DIGESTION TANKS:

Dimenions

Main Floor 12'-0" x 11'8" x 12'-6" high

Basement 12'-0" x 11'8" x 8'-0" high

CHLORINATION OF EFFLUENT:

One vacuum type chlorinator with capacity up to 350 lbs. chlorine per day gives a maximum dosage of 35 parts per million at average flow. A chlorine pipe direct from the control building, discharges to outlet chamber.

METERING

Total plant flow - by Venturi Meter

AIR BLOWERS:

Two air blowers for aerated grit chamber and settling tank, entry channel, aeration.

Maximum Capacity of each blower is 75 cfm

OUTLET:

Effluent is discharged to the Bay of Quinte at the mouth of the Trent River, through a 30" diameter outlet to 500 ft. off shore.

SEWAGE PUMPING STATION ON DUNDAS STREET

PUMP NO.: 1

CAPACITY: 700 IGPM

TOTAL HEAD: 53 feet

POWER REQUIREMENT

$$\frac{700 \times 53}{3300 \times 0.85} = 13.4 \text{ HP}$$

MAXIMUM PUMP R.P.M.:

Revolutions per minute: 900

PUMP NO. 2

CAPACITY: 3130 IGPM diesel - working through Johnson R. A. gear dr.

TOTAL HEAD:

100 feet

MAXIMUM PUMP R.P.M.:

900

PUMP NO. 3:

CAPACITY: 1740

TOTAL HEAD: 65 feet

POWER SUPPLY:

$$\frac{1740 \times 65}{3300 \times 0.85} = 40.3 \text{ HP}$$

MAXIMUM PUMP R.P.M.:

600

Total Capacity of three pumps: 5570 IGPM

Pumps Nos. 2 and 3 have identical casing so that the capacity of pump No. 3 may be increased in future to the capacity of pump No. 2.

Electric motors for driving the pumps Nos. 1 & 3 are drip-proof vertical, squirrel-cage induction type, suitable for full voltage starting and operation on three phase, 60 cycle alternating current. The meters comply with NEMA standards. The diesel engine is of a type, suitable for operation on No. 2 fuel oil.

An auxillary fuel pump is supplied and installed integrally with the engine.

Bar screens at the inlet consist of two sections of 2" x 1/4" bars, i.e. 2 section of 15 bars @ 2" centers.

OVERFLOW PIPE:

24" diameter

There is a force main on an easement from the Dundas Street pumping station on Ontario Street. It comprises 168' of 20" ϕ and on Ontario St. Foundry Street, the Easement and the Corporation land from the Easement to the sewage treatment plant 2,800 feet of 16" ϕ pipe.

The pumping station and sewage treatment plant suffered numerous minor mishaps which can be expected on new installations. However, these difficulties continued longer than anticipated. Mr. Hockaday terminated his services with the Commission on November 1st, 1960. His replacement Mr. J. Stewart is operating the works with more success.

In recent months, the sewage treatment plant has been running efficiently and within the scope of its budget.

Trenton is one of several towns on the Trent River which is making a determined effort to combat River and Bay pollution.

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